Discussion forum

Some ethical issues in brain imaging

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O Lord, you have searched me and you know me. You know when I sit and when I rise; you perceive my thoughts from afar.

The Holy Bible (Psalm 139 verses 1 and 2)

Although we still consider our thoughts to be private, technology continues to move in a direction which may allow others to understand and access what goes on inside our heads in a reliable way. At present, this can only be done with our express permission; however, it is possible that in the future this may be achieved without our knowledge. These possibilities throw up many ethical questions, including who should be able to view our brain activity, and to what use should such information be put?

In considering brain imaging, it is possible to discern two general categories of issue: those emerging from what humankind can do, such as the ethical problems raised by advances in functional neuroimaging, psychopharmacology, brain implants and brain–machine interfaces, and those emerging from what humankind knows, such as the ethical problems raised by humankind’s growing understanding of the neural bases of behaviour, personality, consciousness, and states of spiritual transcendence. Are we, ultimately, anything more than mere machines, driven by our neurons?

While we have long been able to accurately image and analyse other parts of our bodies, many would argue that the ability to image our brains has more profound implications. After all, to image the liver or another organ does not in itself induce any response or change to that organ; the brain is intimately involved in the processing of and response to the information gained from the image. The ability to view what is happening inside our heads has also presented clinicians and researchers with dilemmas, such as what to do about incidental findings. A significant minority of patients have magnetic resonance imaging (MRI) or other scans reveals unexpected malformations, dysfunctions or other anomalous findings: questions around whether the research participant or patient should be made aware of, in many cases, may, be benign findings in their brains have been the subject of a number of research articles and recommendations (Morris et al., 2009; Jordan et al., 2010).

1. Guilty or innocent?

In addition to the myriad technological issues involved, the field relating to developments in brain imaging encompasses the ethical issues raised by neuroscience as it affects humankind’s understanding of the world and of ourselves in the world. For example, if everything human persons do is physically caused or directed by their brains, which are in turn a product of their biology and their life experiences, how can individuals be held responsible for their actions? “It wasn’t me — my neurons made me do it” becomes a legitimate defence of our actions. When these actions cross the line into antisocial or criminal behaviours, are the courts competent to interpret evidence from brain imaging? Presented with a functional MRI (fMRI) scan purporting to show that the accused has an aberrant response pattern to a stimulus when compared to the “normal” population, many jurors may be persuaded by the very power of the image. The danger may lie not just in the information being presented, but in a misunderstanding of the meaning and relevance of this information as well as the “easily interpreted” format in which it is presented to the non-expert.

Is it a legitimate defence to claim that for example a brain tumour or other detectable malformation ‘made you do it’? Do the brains of minors have the same decision-making and impulse control as adult brains and how does that change the approach of the justice system? How should we assess responsibility, given that many behaviours are driven by systems of the brain that we cannot control? What about addictions, predispositions or predilections? The ideas of rehabilitation, fresh

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start and forgiveness also come under scrutiny if people are deemed to be destined to criminal behaviour.

Another area where responsibility is important is in religion. Indeed, should individuals only be considered as, or reduced to, biological robots, then concepts such as forgiveness, grace and mercifulness would no longer have any importance. Even the difference between good and bad would need to be re-appraised which would have fundamental consequences for the concept of justice.

In addition, Prof David Eagleman, from Baylor College of Medicine, argues that there is an arbitrary nature to legal decisions made on the basis of brain imaging. Technology has limits of detection, but if a person falls on one side of the current limit and “abnormalities” can be detected, the person receives treatment. On the other side of the line, they may receive retribution. Perhaps in the future, it is argued, this limit of detection may move in such a way that society’s response to a particular form of behaviour changes (BBC, 2010).

2. Who should be able to see what you’re thinking?

With the ability to access our thoughts comes questions such as: who should have permission to do so, and when? Very few of us may be comfortable with our thoughts being monitored at all times, even by those we trust most. Martha J Farah of the Dana Foundation has argued that:

“Neuroimaging opens a window into the psychology of individuals that is unprecedented in genetic testing or any other biomedical procedure. Although privacy is a central issue in classical bioethics, protection of mental privacy—the freedom to think one’s own thoughts unobserved—adds a significant new dimension to the discussion.” (Farah, 2004)

Who makes the rules as to when our thoughts can be viewed, and what use is made of that information? Neuro-marketing, for example, involves the use of brain imaging to measure consumers’ desire for a product. Some of the brain areas found to be responsible for the cravings experienced by drug abusers seeking a “fix” can also be activated, albeit more weakly, by the sight of legal products. To the extent that neuroimaging can measure desire for a product, it provides a valuable new kind of information for marketers. In one famous study, for example, a subjects liking for Coke versus Pepsi was found to depend on the taste of the drink and also the brand name, and brain activation correlated with both sources of appeal (McClure et al., 2004).

In addition, now that researchers claim to be able to accurately predict a person’s ability to learn complex tasks using MRI (Vo et al., 2011), how long will it be before it is suggested that children should be streamed academically as a result of a pre-school scan?

3. Reductionism: what about love?

As neuroscience learns more about the way the brain supports personality, different kinds of love and moral values, some in the field have argued that there are fewer reasons to suggest any immaterial component of a person – that we are all ultimately merely machines. Many others, however, believe that much work remains to be done in understanding the basis of emotions, rationalization, self-consciousness, moral reasoning and free will. If we are ultimately nothing more than just a series of chemical reactions, does this mean that neuroscience will eventually do away with the need for God, religions and theology. When we have completely unpicked the machine, why consider ethical principles at all, or would individuals just become biological robots which can be used or abused with impunity? What makes humankind special?

4. Consciousness

Wilkinson et al. (2009) have considered fMRI studies of patients in a vegetative state which have provided evidence that such patients retain some degree of consciousness. This may include the patient, who is otherwise unresponsive, being able to process spoken words (Di et al., 2007), or being able to imagine themselves performing an activity such as playing tennis (Owen and Coleman, 2008) or walking through the rooms of a house (Owen et al., 2006), similar to those observed in normal conscious individuals. Such fMRI findings may have profound implications for treatment decisions: does the presence of consciousness makes the withdrawal of life sustaining treatment unjustifiable, or, as Wilkinson et al. have somewhat controversially argued, does the discovery of consciousness in very severely brain-damaged patients provide more reason to let them die? Here the church’s traditional understanding of the inherent dignity of the human person becomes important.

5. Cognitive enhancement

Ritalin and Adderall are prescribed mainly for attention deficit hyperactivity disorder (ADHD). However, evidence suggests that these drugs are now widely used by students studying for exams by up to 25% of students on some US campuses (Greely et al., 2008). For airline pilots or surgeons, the consequences of a lapse in concentration could be dire; some have asked whether such professions have a moral obligation to use such cognitive enhancement technology to help prevent such lapses (Roache, 2008). Conversely, the possibility of the pharmaceutical erasure of unwanted memories is raised by research such as that of Dr Daniela Schiller and colleagues at New York University (Schiller et al., 2010).

6. Conclusions

Brain imaging offers us unprecedented access not only into a part of our anatomy, but into fundamental aspect of our humanity. With that access comes new challenges and ethical issues are created which are unique to the brain. Having “peered into our souls”, what are we – or others – to do with the information gleaned? Rightly did the Teacher in Ecclesiastes declare:
“I applied my mind to study and to explore by wisdom all that is done under the heavens. What a heavy burden God has laid on humanity!” (The Holy Bible)

REFERENCES


The Holy Bible. Ecclesiastes chapter 1 verse 13.
